revolving, dark-brown lines. One specimen shows ten, but five of these are somewhat obsolete and close together near the narrow anterior portion of the shell. I have found living specimens at St. Augustine, Fla., in which the blotches were a light rose-pink, with the six revolving lines of a similar color. Dr. Dall records, from Belize, a pale salmon-colored specimen with the lines obsolete. The species varies in length from 65–85 mm. It ranges from North Carolina to Florida and westward to Mexico.

THREE NEW ALPINE VERTIGOS FROM CALIFORNIA.

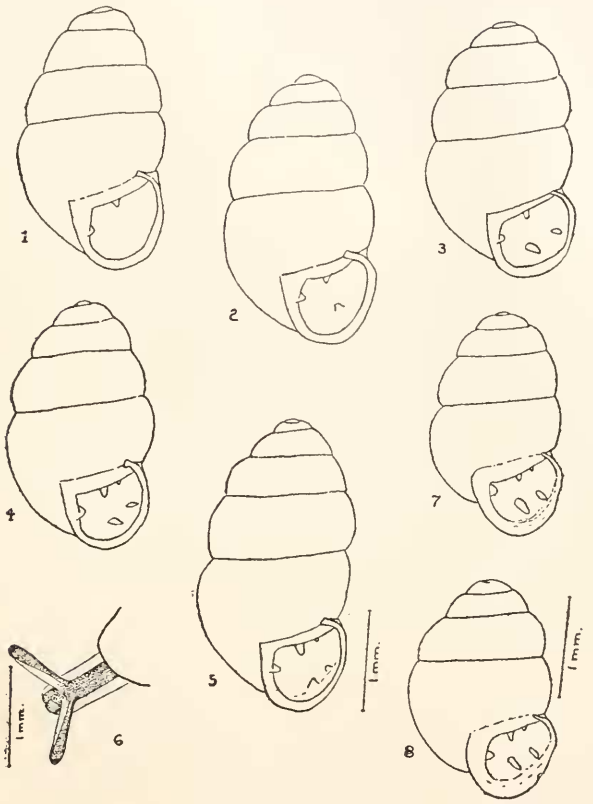
BY S. STILLMAN BERRY.

Among numerous *Pupillidae* collected from the higher mountain regions of California during the past few years appear several apparently undescribed forms, diagnoses of three of which are given below.

VERTIGO MODESTA MICROPHASMA, new subspecies. Figs. 1–6.

The shell is cylindro-conic, rimate-umbilicate, thin, very pale horn color, by transmitted light transparent and colorless. The surface is glossy and distinctly irregularly, obliquely striate, especially on the upper whorls. The spire tapers from the last whorl, at first gradually, then more rapidly, to the obtuse apex. The whorls are strongly convex, the last with an indentation just back of the aperture over the lower palatal tooth, subsequently with a narrow, abrupt, axial constriction, then swollen to form a low, wave-like crest just back of and parallel to the lip. The aperture is rounded triangular, scarcely constricted on the outer margin, the peristome thickened and porcelain white in color, showing through the back of the shell as a white line, but the sharp lip scarcely reflected except over the columella. The posterior angle of the outer lip curves in rather sharply to the body whorl. The number of teeth varies from 2 to 5. The palatal and columellar lamellae are always well developed. In addition there is almost always a well developed lower palatal. A smaller, but variable upper palatal

is frequently present, as also a minute angular lamella. All the teeth are porcelain-white in color.



1–6, VERTIGO MODESTA MICROPHASMA. 7, VERTIGO ALLYNIANA. 8, V. A. XENOS.

Length of type 2.6; diameter to lip edge 1.5; length of aperture 0.9 mm.; whorls 5.

Type: Cat. No. 2740 of the writer's collection. Paratypes in the Academy of Natural Sciences of Philadelphia, California Academy of Sciences, Southwest Museum, United States National Museum, and the private collections of Mr. George H. Clapp and others.

Type Locality: 7,550 feet altitude, cienaga near Bluff Lake, San Bernardino Mountains, California; under sticks and logs at edge of forest; Nina G. Spaulding, G. E. Dole and S. S. Berry, August, 1910; 59 specimens in this and neighboring cienagas.

Also taken at 7,200 feet altitude, west slope of Falls Creek Canyon, near the narrows about one mile above Dobbs Cabin, Dollar Pass Trail, San Bernardino Mountains, California; under small sticks and pine cones on springy slope; G. E. Dole and S. S. Berry, Sept. 29, 1918; 32 specimens.

Remarks: This very puzzling little mollusk is one of the most beautiful of American Vertigos. It is very close to *V. modesta parietalis* and may also be described as an albinistic race of that subspecies, but it is a protean form and some shells are equally close to *V. modesta modesta* or even to *V. m. castanea.* That it is more than a mere "albino" of the recognized type is strongly evidenced by its occurrence in such abundance and at scattered localities, as also by the fact that its distribution is by no means coincident with that of any of the other forms mentioned. Nor, although usually associated, do the white or brown shells occur in any apparent regular ratio. At the second locality above cited diligent outlook yielded but three specimens of the brown *parietalis.* It is evidently a comparatively recent offshoot from the parent stock, but the field evidence is that it already is a race with its peculiar characters heritable to a marked degree.

It seems rather remarkable that such features as the color, shell texture, and similar characters in this form should exhibit such constancy as compared with the variability shown in the development of the lamellae. In 39 specimens of the type lot now before me, 1 has only 2 teeth (columellar and parietal), 15 have 3 teeth (columellar, parietal, and lower palatal), 9 have 4 teeth (an upper palatal usually the one added), and 14 have a full set of 5 teeth. No mature specimens with fewer than 2 nor more than 5 teeth have been noted. This variation in a single well-defined colony (its members having, as shown by the other characters noted, an undoubtedly close phylogenetic relationship with one another) throws a valuable bit of light on the difficulty of attempting the separation of the var-

ious races of the *modesta*-series by means of variations in the number of teeth alone. It chances that the specimen chosen as type is one of the 3-toothed forms.

The animal is bluish-gray or slate in color, the body quite dark, the foot and peripheral portions much lighter and semi-transparent. A rough sketch of the cephalic region of one of the Falls Creek specimens is offered in fig. 6.

Whether the hereditary value of this race is that of a "form" or a subspecies can only be shown by the more detailed study which must be left for the future. Until then the personal equation must necessarily largely govern. In any case it will prove useful to have a name for it.

VERTIGO ALLYNIANA new species. Fig. 7.

The shell is minute, short, robust, ovate-conic in outline, thin, dark reddish-brown in color, with only a dull gloss; weakly, irregularly striate. The spire tapers with increasing rapidity from the last whorl to the obtuse apex. The whorls are convex, the last having a shallow but distinct excavation in the palatal region and a weaker one over the upper palatal tooth, the latter extending to the lip, which thus becomes flattened or very slightly indented on its outer segment. The aperture is pyriform in outline, and would be rather small except for the quite flaring lip, which is little thickened and very fragile at the edge. There are 5 teeth constantly developed in all the material examined. The parietal, columellar, and upper and lower palatal lamellae are well developed, and there is a distinct, though small angular lamella. The columellar is situated well back in the aperture and quite high up on the pillar. The lower palatal is also rather deeply immersed.

Length of type 2.1; diameter to lip edge 1.3; length of aperture 0.81 mm.; whorls $4\frac{3}{4}$.

Type: Cat. No. 3764 of the writer's collection. Paratypes in the Academy of Natural Sciences of Philadelphia, and the private collection of Allyn G. Smith.

Type Locality: Donner Lake, California; A. G. Smith, May 30, 1916; 22 specimens.

Remarks: I am not quite certain of the relationships of this

small *Vertigo*. The texture of the shell, as well as the shape, are strongly reminiscent of *V. occidentalis* Sterki, a more weakly toothed species from the San Bernardino Mountains. None of the other species with which I am familiar require any special comparison. *V. corpulenta* (Morse) has a somewhat similar outline, but otherwise does not seem especially close.

VERTIGO ALLYNIANA XENOS, new subspecies. Fig. 8.

With the preceding occurred a single specimen of a very similar form having the same number of teeth, but differing abruptly in its shorter, much more robust and swollen outline, its more transparent, glossier texture, and lighter brown color. The columellar tooth is placed distinctly further down on the pillar, and the remaining lamellae differ slightly from those of the shells described above both in size and position.

Length of type 2.0; diameter to lip edge 1.5; length of aperture 0.85 mm.; whorls $4\frac{1}{2}$.

Type: Cat. No. 4128 of the writer's collection.

Type Locality: Donner Lake, California; A. G. Smith, May 30, 1916; 1 specimen.

EXPLANATION OF FIGURES.

Figs. 1–5. *Vertigo modesta microphasma* Berry. Camera drawings of type (Fig. 2) and four other specimens of the original lot, showing variation in number of lamellae and shape of shell.

Fig. 6. *Vertigo modesta microphasma* Berry. Camera drawing of cephalic region of living animal as extended in crawling.

Fig. 7. *Vertigo allyniana* Berry. Camera drawing of type.

Fig. 8. *Vertigo* (allyniana var?) *xenos* Berry. Camera drawing of type.

All figures drawn to same scale.

Redlands, California.